

CLAIMS

1. A method of manufacturing a carrier rope, comprising the steps of:
 imparting a twist to a plurality of multi filament yarns forming a multi filament yarn assembly;
 imparting a second twist to mono filament yarn around the multi filament yarn assembly forming a composite yarn assembly, wherein the multi filament yarn assembly is not further twisted;
 braiding a plurality of the composite yarn assemblies forming a braided plait assembly;
and
 braiding a plurality of the braided plait assemblies forming a carrier rope.
2. The method of manufacture of Claim 1, wherein the multi filament yarn assembly comprises 4 ends of 700 denier multi filament nylon 6.6.
3. The method of manufacture of Claim 1, wherein the multi filament yarn assembly comprises equal Z twist and S twist yarns.
4. The method of manufacture of Claim 1, wherein the multi filament yarn assembly is imparted with an initial twist comprising 22 twists per foot.
5. The method of manufacture of Claim 1, wherein the multi filament yarn assembly is

imparted with an initial twist comprising from 20 to 30 twists per foot.

6. The method of manufacture of Claim 1, wherein the multi filament yarns forming the multi filament yarn assembly comprise nylon.

7. The method of manufacture of Claim 1, wherein the multi filament yarns forming the multi filament yarn assembly comprise polyester.

8. The method of manufacture of Claim 1, wherein the multi filament yarn assembly comprises from 2500 to 5400 tex.

9. The method of manufacture of Claim 1, further comprising the step of applying a protective coating to the multi filament yarn assembly.

10. The method of manufacture of Claim 9, further comprising the step of dipping the multi filament yarn assembly in a polyurethane based solution bath.

11. The method of manufacture of Claim 1, wherein the mono filament yarn comprises from 0.20 to 0.32 mm in diameter.

12. The method of manufacture of Claim 1, wherein the monofilament yarn is 0.24 mm in diameter.

13. The method of manufacture of Claim 1, wherein the composite yarn assembly comprises Z twist monofilament yarns.
14. The method of manufacture of Claim 1, wherein the composite yarn assembly comprises S twist mono filament yarns.
15. The method of manufacture of Claim 1, wherein a single mono filament yarn is twisted around the multi filament yarn assembly, wherein the multi filament yarn assembly is not further twisted.
16. The method of manufacture of Claim 1, wherein the braided plait assembly comprises equal Z twist and S twist ends of the composite yarn assembly.
17. The method of manufacture of Claim 1, further comprising the step of heat setting the individual braided plait assemblies prior to braiding the braided plait assemblies to form the carrier rope.
18. The method of manufacture of Claim 1, further comprising the step of pre-stretching the individual braided plait assemblies prior to braiding the braided plait assemblies to form the carrier rope.
19. The method of manufacture of Claim 1, further comprising the step of braiding the

composite yarn assemblies on a 16 carrier braider to form the braided plait assembly.

20. The method of manufacture of Claim 19, wherein the 16 carrier braided plait assembly comprises a pick repeat of 102ppf.

21. The method of manufacture of Claim 1, further comprising the step of braiding the composite yarn assemblies on a 32 carrier braider to form the braided plait assembly.

22. The method of manufacture of Claim 1, further comprising the step of braiding the composite yarn assembly about a core forming a cored braided plait assembly.

23. The method of manufacture of Claim 22, wherein the core comprises three strands of 8400tex nylon.

24. The method of manufacture of Claim 1, further comprising the step of knitting the braided plait assembly.

25. The method of manufacture of Claim 1, further comprising the step of braiding the braided plait assembly on an 8 carrier braider.

26. The method of manufacture of Claim 25, wherein the 8 carrier rope comprises a pick repeat of 21ppf.

27. The method of manufacture of Claim 1, further comprising the step of braiding the braided plait assembly on a 16 carrier braider.
28. The method of manufacture of Claim 1, further comprising the step of braiding the braided plait assembly about a core forming a cored carrier rope.
29. The method of manufacture of Claim 1, further comprising the step of applying a protective coating to the carrier rope.
30. The method of manufacture of Claim 29, further comprising the step of dipping the carrier rope in a polyurethane based solution bath.
31. A method of manufacturing a carrier rope comprising the steps of:
- imparting a twist to four ends of 700 dtex multi filament nylon 6.6 in equal Z and S twist yarns forming a multi filament yarn assembly;
 - imparting a second twist to a single mono filament nylon 6 yarn around the multi filament yarn assembly forming a composite yarn assembly, wherein the multi filament yarn assembly is not further twisted;
 - braiding eight Z twist ends and eight S twist ends of the composite yarn assembly forming a braided plait assembly;
 - braiding eight ends of the braided plait assemblies forming a carrier rope;
 - applying a protective coating to the carrier rope; and

heat setting the carrier rope

32. A method of manufacturing a carrier rope comprising the steps of:

imparting a twist to a plurality of multi filament nylon yarns in equal Z and S twist yarns forming a multi filament yarn assembly;

imparting a second twist to mono filament nylon yarn around the multi filament yarn assembly forming a composite yarn assembly, wherein the multi filament yarn assembly is not further twisted;

braiding sixteen ends of the composite yarn assembly forming a braided plait assembly;

braiding eight ends of the braided plait assembly forming a carrier rope;

applying a protective coating; and

heat setting the carrier rope.

33. A carrier rope, comprising:
- a multi filament yarn assembly comprising a twist of a plurality of multi filament yarns;
 - a composite yarn assembly comprising a twist of mono filament yarn around the multi filament yarn assembly, wherein the multi filament yarn assembly is not further twisted;
 - a braided plait assembly comprising a braid of a plurality of composite yarn assemblies;
- and
- a braid of a plurality of braided plait assemblies.
34. The carrier rope of Claim 33, wherein the multi filament yarns assembly comprises 4 ends of 700 denier multi filament nylon 6.6.
35. The carrier rope of Claim 33, wherein the multi filament yarn assembly comprises equal Z twist and S twist yarns.
36. The carrier rope of Claim 33, wherein the multi filament yarn assembly is imparted with an initial twist from 20 to 30 twists per foot.
37. The carrier rope of Claim 33, wherein the multi filament yarn assembly is imparted with an initial twist comprising 22 twists per foot.
38. The carrier rope of Claim 33, wherein the multi filament yarns forming the multi filament yarn assembly comprise nylon.

39. The carrier rope of Claim 33, wherein the multi filament yarns forming the multi filament yarn assembly comprise polyester.
40. The carrier rope of Claim 33, wherein the multi filament yarn assembly comprises from 2500 to 5400 tex.
41. The carrier rope of Claim 33, wherein the multi filament yarn assembly is impregnated with a protective coating.
42. The carrier rope of Claim 41, wherein the protective coating comprises a polyurethane based solution.
43. The carrier rope of Claim 33, wherein the mono filament yarn comprises a from 0.20 to 0.32 mm in diameter.
44. The carrier rope of Claim 33, wherein the monofilament yarn is 0.24 mm in diameter.
45. The carrier rope of Claim 33, wherein the composite yarn assembly comprises Z twist monofilament yarns.
46. The carrier rope of Claim 33, wherein the composite yarn assembly comprises S twist mono filament yarns.

47. The carrier rope of Claim 33, wherein a single mono filament yarn is twisted around the multi filament yarn assembly, wherein the multi filament yarn assembly is not further twisted.
48. The carrier rope of Claim 33, wherein the braided plait assembly comprises equal Z twist and S twist ends of the composite yarn assembly.
49. The carrier rope of Claim 33, wherein the braided plait assemblies are heat set prior to braiding the braided plait assemblies to form the carrier rope.
50. The carrier rope of Claim 33, wherein the individual braided plait assemblies are pre-stretched prior to braiding the braided plait assemblies to form the carrier rope.
51. The carrier rope of Claim 33, wherein the composite yarn assemblies are braided on a 16 carrier braider to form the braided plait assembly.
52. The carrier rope of Claim 51, wherein the 16 carrier braided plait assembly comprises a pick repeat of 102ppf.
53. The carrier rope of Claim 33, wherein the composite yarn assemblies are braided on a 32 carrier braider to form the braided plait assembly.
54. The carrier rope of Claim 33, wherein the composite yarn assembly is braided about a

core forming a cored braided plait assembly.

55. The carrier rope of Claim 54, wherein the core comprises three strands of 8400tex nylon.

56. The carrier rope of Claim 33, wherein the braided plait assembly is formed via a knitting machine.

57. The carrier rope of Claim 33, wherein the braided plait assembly is braided on an 8 carrier braider.

58. The carrier rope of Claim 56, wherein the 8 carrier rope comprises a pick repeat of 21ppf.

59. The carrier rope of Claim 33, wherein the braided plait assembly is braided on a 16 carrier braider.

60. The carrier rope of Claim 33, wherein the braided plait assembly is braided about a core forming a cored carrier rope assembly.

61. The carrier rope of Claim 33, wherein the carrier rope is impregnated with a protective coating.

62. The carrier rope of Claim 61, wherein the protective coating comprises a polyurethane based solution.

63. A carrier rope, comprising:

- a multi filament yarn assembly comprising a twist of four ends of 700 dtex multi filament nylon 6.6 in equal Z and S twist yarns;

- a composite yarn assembly comprising a second twist of one end a single mono filament nylon 6 yarn around the multi filament yarn assembly, wherein the multi filament yarn assembly is not further twisted;

- a braided plait assembly comprising a braid of eight Z twist ends and eight S twist ends of the composite yarn assembly;

- a braid of eight ends of the braided plait assembly; and

- a protective coating applied to the carrier rope.

64. A carrier rope, comprising:

- a multi filament yarn assembly comprising a twist of a plurality of multi filament nylon yarns in equal Z and S twist yarns;

- a composite yarn assembly comprising a second twist of mono filament nylon yarn around the multi filament yarn assembly, wherein the multi filament yarn assembly is not further twisted;

- a braided plait assembly comprising a braid of sixteen ends of the composite yarn assembly; and

a braid of eight ends of the braided plait assembly; and
a protective coating.

65. A method of manufacturing a carrier rope, comprising the steps of:
imparting a twist to a plurality of multi filament yarns forming a multi filament yarn assembly;
braiding a plurality of the multi filament yarn assemblies forming a braided plait assembly;
imparting a second twist to monofilament yarn around the braided plait assembly forming a composite plait assembly, wherein the braided plait assembly is not further twisted; and
braiding a plurality of the composite plait assemblies forming a carrier rope.
66. The method of manufacture of Claim 65, wherein the multi filament yarns assembly comprises 4 ends of 700 denier multi filament nylon 6.6.
67. The method of manufacture of Claim 65, wherein the multi filament yarn assembly comprises equal Z twist and S twist yarns.
68. The method of manufacture of Claim 65, wherein the multi filament yarn assembly is imparted with an initial twist from 20 to 30 twists per foot.
69. The method of manufacture of Claim 65, wherein the multi filament yarn assembly is

imparted with an initial twist comprising 22 twists per foot.

70. The method of manufacture of Claim 65, wherein the multi filament yarns forming the multi filament yarn assembly comprise nylon.

71. The method of manufacture of Claim 65, wherein the multi filament yarns forming the multi filament yarn assembly comprise polyester.

72. The method of manufacture of Claim 65, wherein the multi filament yarn assembly comprises from 2500 to 5400 tex.

73. The method of manufacture of Claim 65, further comprising the step of applying a protective coating to the multi filament yarn assembly.

74. The method of manufacture of Claim 73, further comprising the step of dipping the multi filament yarn assembly in a polyurethane based solution bath.

75. The method of manufacture of Claim 65, further comprising the step of braiding the multi filament yarn assemblies on a 16 carrier braider to form the braided plait assembly.

76. The method of manufacture of Claim 75, wherein the 16 carrier braided plait assembly comprises a pick repeat of 102ppf.

77. The method of manufacture of Claim 65, further comprising the step of braiding the multi filament yarn assemblies on a 32 carrier braider to form the braided plait assembly.
78. The method of manufacture of Claim 65, further comprising the step of braiding the multi filament yarn assembly about a core forming a cored braided plait assembly.
79. The method of manufacture of Claim 77, wherein the core comprises three strands of 8400 tex nylon.
80. The method of manufacture of Claim 65, further comprising the step of knitting the braided plait assembly.
81. The method of manufacture of Claim 65, wherein the mono filament yarn comprises from 0.20 to 0.32 mm in diameter.
82. The method of manufacture of Claim 65, wherein the monofilament yarn is 0.24 mm in diameter.
83. The method of manufacture of Claim 65, wherein the composite plait assembly comprises Z twist monofilament yarns.
84. The method of manufacture of Claim 65, wherein the composite plait assembly comprises

S twist mono filament yarns.

85. The method of manufacture of Claim 65, wherein a single mono filament yarn is twisted around the braided plait assembly forming a composite plait assembly, wherein the braided plait assembly is not further twisted.

86. The method of manufacture of Claim 65, wherein the composite plait assembly comprises equal Z twist and S twist ends of the multi filament yarn assembly.

87. The method of manufacture of Claim 65, further comprising the step of applying a protective coating to the composite plait assembly.

88. The method of manufacture of Claim 87, further comprising the step of dipping the composite plait assembly in a polyurethane solution bath.

89. The method of manufacture of Claim 65, further comprising the step of heat setting the individual composite plait assemblies prior to braiding the composite plait assemblies to form the carrier rope.

90. The method of manufacture of Claim 65, further comprising the step of pre-stretching the individual composite plait assemblies prior to braiding the composite plait assemblies to form the carrier rope.

91. The method of manufacture of Claim 65, further comprising the step of braiding the composite plait assembly on an 8 carrier braider.
92. The method of manufacture of Claim 91, wherein the 8 carrier rope comprises a pick repeat of 21ppf.
93. The method of manufacture of Claim 65, wherein the composite plait assembly is braided on a 16 carrier braider.
94. The method of manufacture of Claim 65, further comprising the step of braiding the composite plait assembly about a core forming a cored carrier rope.
95. The method of manufacture of Claim 65, further comprising the step of applying a protective coating to the carrier rope.
96. The method of manufacture of Claim 95, further comprising the step of dipping the carrier rope in a polyurethane based solution bath.

97. A method of manufacturing a carrier rope, comprising the steps of:

imparting a twist to four ends of 700 dtex multi filament nylon 6.6 in equal Z and S twist yarns forming a multi filament yarn assembly;

braiding eight Z twist and eight S twist ends of the multi filament yarn assemblies forming a braided plait assembly;

imparting a second twist to a 0.24mm monofilament nylon 6 yarn around the braided plait assembly forming a composite plait assembly, wherein the braided plait assembly is not further twisted;

braiding eight ends of the composite plait assemblies forming a carrier rope;

applying a protective coating to the carrier rope; and

heat setting the carrier rope.

98. A method of manufacturing a carrier rope, comprising the steps of:

imparting a twist to a plurality of multi filament nylon yarns in equal Z and S twists forming a multi filament yarn assembly;

braiding sixteen ends of the multi filament yarn assemblies forming a braided plait assembly;

imparting a second twist to monofilament nylon yarn around the braided plait assembly forming a composite plait assembly, wherein the braided plait assembly is not further twisted; and

braiding eight ends of the composite plait assemblies forming a carrier rope;

applying a protective coating; and

heat setting the carrier rope.

99. A carrier rope, comprising:

a multi filament yarn assembly comprising a twist of a plurality of multi filament yarns;

a braided plait assembly comprising a braid of a plurality of multi filament yarn assemblies;

a composite braided plait assembly comprising a second twist of mono filament yarn around the braided plait assembly, wherein the braided plait assembly is not further twisted; and

a braid of a plurality of composite braided plait assemblies.

100. The carrier rope of Claim 99, wherein the multi filament yarns assembly comprises 4 ends of 700 denier multi filament nylon 6.6.

101. The carrier rope of Claim 99, wherein the multi filament yarn assembly comprises equal Z twist and S twist yarns.

102. The carrier rope of Claim 99, wherein the multi filament yarn assembly comprises an initial twist from 20 to 30 twists per foot.

103. The carrier rope of Claim 99, wherein the multi filament yarn assembly is imparted with an initial twist comprising 22 twists per foot.

104. The carrier rope of Claim 99, wherein the multi filament yarns forming the multi filament yarn assembly comprise nylon.

105. The carrier rope of Claim 99, wherein the multi filament yarns forming the multi filament yarn assembly comprise polyester.

106. The carrier rope of Claim 99, wherein the multi filament yarn assembly comprises from 2500 to 5400 tex.

107. The carrier rope of Claim 99, wherein the multi filament yarn assembly is impregnated with a protective coating.

108. The carrier rope of Claim 107, wherein the protective coating comprises a polyurethane based solution.

109. The carrier rope of Claim 99, wherein the multi filament yarn assemblies are braided on a 16 carrier braider to form the braided plait assembly.

110. The carrier rope of Claim 109, wherein the 16 carrier braided plait assembly comprises a pick repeat of 102ppf.

111. The carrier rope of Claim 99, wherein the multi filament yarn assemblies are braided on a

32 carrier braider to form the braided plait assembly.

112. The carrier rope of Claim 99, wherein the multi filament yarn assembly is braided about a core forming a cored braided plait assembly.

113. The carrier rope of Claim 112, wherein the core comprises three strands of 8400 tex nylon.

114. The carrier rope of Claim 99, wherein the braided plait assembly is formed via a knitting machine.

115. The carrier rope of Claim 99, wherein the mono filament yarn comprises from 0.20 to 0.32 mm in diameter.

116. The carrier rope of Claim 99, wherein the monofilament yarn is 0.24 mm in diameter.

117. The carrier rope of Claim 99, wherein the composite plait assembly comprises Z twist monofilament yarns.

118. The carrier rope of Claim 99, wherein the composite plait assembly comprises S twist mono filament yarns.

119. The carrier rope of Claim 99, wherein a single mono filament yarn is twisted around the braided plait assembly forming a composite plait assembly, wherein the braided plait assembly is not further twisted.

120. The carrier rope of Claim 99, wherein the composite plait assemblies are impregnated with a protective coating prior to braiding to form a carrier rope.

121. The carrier rope of Claim 120, wherein the composite plait assemblies are dipped in a polyurethane solution bath.

122. The carrier rope of Claim 99, wherein the individual composite braided plait assemblies are heat set prior to braiding the composite plait assemblies to form the carrier rope.

123. The carrier rope of Claim 99, wherein the individual composite braided plait assemblies are pre-stretched prior to braiding the composite plait assemblies to form the carrier rope.

124. The carrier rope of Claim 99, wherein the composite plait assembly is braided on an 8 carrier braider.

125. The carrier rope of Claim 124, wherein the 8 carrier rope comprises a pick repeat of 21ppf.

126. The carrier rope of Claim 99, wherein the composite plait assembly is braided on a 16 carrier braider.

127. The carrier rope of Claim 99, wherein the composite plait assembly is braided about a core forming a cored carrier rope assembly.

128. The carrier rope of Claim 99, wherein the carrier rope is impregnated with a protective coating.

129. The carrier rope of Claim 128, wherein the protective coating comprises a polyurethane based solution.

130. A carrier rope comprising:

a multi filament yarn assembly comprising a twist of four ends of 700 dtex multi filament nylon 6.6 in equal Z and S twist yarns;

a braided plait assembly comprising a braid of eight Z twist ends and eight S twist ends of the multi filament yarn assembly;

a composite braided plait assembly comprising a second twist of a single monofilament nylon 6 yarn around the braided plait assembly, wherein the braided plait assembly is not further twisted;

a braid of eight ends of the composite braided plait assembly; and

a protective coating applied to the carrier rope.

131. A carrier rope, comprising:

a multi filament yarn assembly comprising a twist of a plurality of multi filament nylon yarn in equal Z and S twist yarns;

a braided plait assembly comprising a braid of sixteen ends of the multi filament yarn assembly;

a composite braided plait assembly comprising a second twist of mono filament nylon yarn around the braided plait assembly, wherein the braided plait assembly is not further twisted; and a braid of eight ends of the composite braided plait assembly; and

a protective coating.